ANNALS
OF
The Entomological Society of America

Volume X JUNE, 1917 Number 2

A SYNOPSIS OF THE GENERA OF BEETLE MITES WITH SPECIAL REFERENCE TO THE NORTH AMERICAN FAUNA

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The beetle mites constitute, it is believed, a natural group of the order *Acarina* which, because of its close affinities with some of the other groups of mites, is rather hard to limit or define properly. As considered here, the group includes only those mites which possess, in addition to a hard, chitinous exoskeleton, a pair of modified setæ on the posterior dorsal aspect of the cephalothorax, known to specialists as the pseudostigmatic organs. Thus limited, the beetle mites have been recognized by some workers only as a family, by others as a superfamily, and by several of our foremost authorities as a sub-order. Michael in his treatise on the group[1] considered it as a family, the *Oribatidæ*, which he divided into seven subfamilies. Banks has considered the group as a superfamily, *Oribatoidea*, which formerly he divided into two families, *Hoplodermidæ* and *Oribatidæ*. Recently he has included the family *Labidostommatidæ*[2] also in the superfamily, but this family would not be included in the group as just defined by the writer. Oudemans regards[3] the group as one of the twelve of his subdivisions of the whole order, and gives to it the name of *Octostigmata*. The present writer in 1913, gave a classification of the Acarina[4] in which the tarso-

[1] Michael, A. D. Oribatidæ. Das Tierreich, Lieferung 3, 1898.
[2] Banks, N. The Acarina, or Mites. Report No. 108, U. S. Dept. Agric., 1915.
[3] Oudemans, A. C. A Short Survey of the More Important Families of Acari. Bul. Entom. Research, Vol. I, pp. 105-119, 1910.
[4] Ewing, H. E. New Acarina, Part I. Bull. Amer. Mus. Nat. Hist., Vol. XXXII, Art. V, pp. 93-121, 1913.

nemid mites were included with the beetle mites in a suborder called *Heterotracheata*. The beetle mites were divided into two sections under this suborder, *Ginglymosoma* and *Scleroderma*. The former section included the family *Hoplodermidæ* and the latter the families *Hypochthonidæ*, *Nothridæ*, and *Oribatidæ*. Berlese has in the last few years described some interesting new species, which show both the characters of the family *Hoplodermidæ* and also those of the families *Hypochthonidæ* and *Oribatidæ*. These should, I believe, be regarded as the direct descendents of the "connecting links" between these families, and their discovery must necessarily cause us to regard the *Hoplodermidæ* as being more closely bound to the other families than was formerly believed.

Considering the beetle mites as a phylogenetic unit, disregarding for the present their place in the order to which they belong, we find that they can be easily divided into four families already recognized by others. These four families I have divided into fourteen subfamilies, which are given with the families in the following key:

A KEY TO THE FAMILIES AND SUBFAMILIES OF THE BEETLE MITES.

A. Cephalothorax immovably united to abdomen; trachæ usually present.
  B. Abdomen without dorsal grooves or sutures dividing it into parts; integument well chitinized.
    C. Abdomen provided with chitinous, wing-like expansions known as pteromorphæ, which usually are large and conspicuous, but which may be small and shelf-like.....**Oribatidæ**
      D. Cheliceræ swollen at their bases, styliform beyond, and ending in minute chelæ.....PELOPINÆ
      DD. Cheliceræ stout in the middle and with large chelæ....ORIBATINÆ
    CC. Abdomen without wing-like expansions known as pteromorphæ, even of the rudimentary, shelf-like type.....**Nothridæ**
      D. Cheliceræ rod-like, serrate toward their tips.....SERRARIINÆ
      DD. Cheliceræ not rod-like, chelate.
        E. Fourth pair of legs fitted for jumping.....ZETORCHESTINÆ
        EE. Fourth pair of legs not fitted for jumping.
          F. Lamellæ present, being either blade-like or in the form of straight chitinous ridges.
            G. Integument of dorsal surface of abdomen smooth, and without markings of any kind.....NOTASPIDINÆ
            GG. Integument with markings in the form of reticulations, tubercles, pits, sculpturings, or ridges.....TEGEOCRANINÆ
          FF. True lamellæ absent, but crooked or irregular ridges may be present.
            G. Some of the segments of the legs other than the femora swollen toward their distal ends and pedicellate proximally; legs slender.....DAMAEINÆ
            GG. None of the segments of the legs swollen and pedicellate except the femora.
              H. Ventral plate present, and usually containing the genital and anal apertures.....NOTHRINÆ
              HH. Ventral plate absent or rudimentary, and in no case inclosing genital and anal apertures.....LOHMANNINÆ

BB. Abdomen divided into areas dorsally by grooves or sutures making it appear segmented; integument usually poorly chitinized..**Hypochthonidæ**
C. Dorsal sutures of abdomen oblique; segments of legs inflated..Trizetinæ
CC. Dorsal sutures of abdomen transverse; segments of legs not inflated, Hypochthoninæ
AA. Cephalothorax hinged to abdomen; tracheæ absent.....**Hoplodermatidæ**
B. Abdomen divided into parts, as if segmented, by transverse grooves or sutures.....Protoplophorinæ
BB. Abdomen not divided into parts, as if segmented, by transverse grooves or sutures.
C. Genital and anal openings situated in a large ventral plate which is anchylosed to dorsal plate.....Mesoplophorinæ
CC. Genital and anal openings not situated in a large ventral plate, anchylosed to dorsal plate.....Hoplodermatinæ

These fourteen subfamilies contain many genera; especially is the subfamily *Oribatinæ* rich in genera. I have tried in the following pages to key out as many of the genera of the very large number proposed as appeared to be based upon good characters, and to be acceptable from the standpoint of nomenclature. However, a few genera appear to be good, that I have not been able to place in my keys, because of incomplete data on their generic characteristics. Many proposed genera will not be found in my keys. For various reasons some twenty-four of these have been excluded. Some were founded upon characters which I regard as purely specific; others are almost, if not exact, synonyms of older genera; others have names which are preoccupied; and yet others have been rejected for various reasons not here mentioned.

In the keys which follow, readers will find given with each genus the name of its author, the date of its establishment, and the name of its type species. Lack of space forbids a discussion of taxonomic points involved in the fixing of some of these types. In a few cases these will be given briefly in footnotes.

Family Oribatidæ.

Key to the Genera of Subfamily Pelopinæ.

a. Abdomen with a shelf-like expansion extending forward from its anterior margin over the base of the cephalothorax.
b. No true lamellæ or translamella present.....**Pelops** Koch, 1835 [Type: *P. acromios* (Hermann)]
bb. Lamellæ, and frequently translamella present.....**Euplops** n. gen. [Type: *Pelops uraceus* Koch]
aa. Abdomen without shelf-like expansion at its anterior margin, **Peloptulus**[5] Berlese, 1908 [Type: *Pelops phaeonotus* Koch]

[5]Erected as a subgenus by Berlese.

Key to the Genera of Subfamily Oribatinæ.

a. Pteromorphæ attached, or apparently attached, to both cephalothorax and abdomen.....Tribe TANEOPTERA
b. Abdomen circular, or almost circular, in outline, and bearing large setæ,
Neogymnobates n. gen.
[Type: *N. multipilosus* (Ewing)]
bb. Abdomen very long, subcylindrical; either hairless, or bearing small setæ.
c. Sides of cephalothorax and of abdomen somewhat swollen so that they are not parallel; femora II without expansions..**Gymnobates** Banks, 1902
[Type: *G. glaber* Banks]
cc. Sides of cephalothorax and abdomen subparallel; femora II with blade-like expansions.....**Oripoda** Banks and Pergande, 1910 (?)
[Type: *O. elongata* Banks and Pergande]
aa. Pteromorphæ attached to abdomen only.
b. Pteromorphæ not truncate in front; extending beyond the anterior margin of abdomen.....Tribe MACROPTERA
c. Pteromorphæ continuous with dorsal plate, not hinged to abdomen.
d. Pteromorphæ not extending downward from the place of their insertion, but projecting forward along the sides of cephalothorax,
Tenuiala Ewing, 1913
[Type: *T. nuda* Ewing]
dd. Pteromorphæ extending downward as well as forward from the place of their insertion.....**Achipteria** Berlese, 1885
[Type: *Oribata nicoletii* Berlese]
cc. Pteromorphæ not continuous with dorsal plate, but hinged to it in such a manner that they can be folded down over the ventral surface of the body.....**Oribata**[6] Latreille, 1802
[Type: *Notaspis alatus* Hermann]
bb. Pteromorphæ usually truncate, not extending beyond the anterior margin of the abdomen.....Tribe BRACHYPTERA
c. Pteromorphæ united by a transverse shelf-like expansion from the anterior margin of abdomen.....**Jugatala** Ewing, 1913
[Type: *J. tuberosa* Ewing]
cc. Pteromorphæ not united by a shelf-like expansion from the abdomen.
d. Cephalothorax completely covered by a roof-like projection from its line of junction with the abdomen.....**Tegoribates** n. gen.
[Type: *T. subniger* Ewing]
dd. Cephalothorax not covered by any roof-like projection from the line of its junction with the abdomen.
e. Lamellæ attached to cephalothorax along a part, or the whole of their inner borders.
f. Either translamella present, or the lamellæ joined to each other in front.
g. Pteromorphæ not rudimentary (cusp-like, or shelf-like).
h. Integument rough, being either tuberculate or corrugated.
Eremaeozetes Berlese, 1913
[Type: *E. tuberculatus* Berlese]
hh. Integument not rough, although it may be finely punctate.
i. Translamella blade-like, or lamellæ joined in front.
j. Two pairs of lamellæ present, also tectopedia for legs II,
Sphaerozetes Berlese, 1885
[Type: *Oribates orbicularis* Koch]
jj. A single pair of lamellæ present, tectopedia for second pair of legs absent.....**Podoribates** Berlese, 1908
[Type: *Oribates longipes* Berlese]
ii. Translamella a mere ridge.....**Protoribates** Berlese, 1908
[Type: *Oribates dentatus* Berlese]

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[6]Oudemans and Banks use *Galumna* instead of *Oribata*, or *Oribates*, for this genus, holding that the *Notaspis alatus* Hermann is not a true *Oribata*. The writer prefers to follow Michael and others, believing it to belong to *Oribata*.

gg. Pteromorphæ rudimentary, shelf-like.....**Neoribatula** n. gen.
[Type: *N. brevisetosa* (Ewing)]

ff. Translamella absent, but lamellæ sometimes joined by a line (not by a ridge).

g. Tarsal claws monodactyle.

h. Integument rough, or pitted.....**Tegeozetes** Berlese, 1913
[Type: *T. tunicatus* Berlese]

hh. Integument smooth.....**Oribatodes** Banks, 1895
[Type: *O. mirabilis* Banks]

gg. Tarsal claws tridactyle.

h. Pteromorphæ rudimentary, or shelf-like, **Oributula** Berlese, 1896
[Type: *O. tibialis* (Nicolet)]

hh. Pteromorphæ not rudimentary.

i. Integument of dorsum smooth.....**Ceratozetes** Berlese, 1908
[Type: *Oribates gracilis* Michael]

ii. Integument rough, reticulate, or pitted.

j. No hairs on abdomen..... **Trachyoribates** Berlese, 1908
[Type: *Oribates ampulla* Berlese]

jj. Conspicuous hairs on abdomen...**Peloribates** Berlese, 1908
[Type: *Oribates peloptoides* Berlese]

ee. Lamellæ attached to cephalothorax at their bases only, very large.

f. Lamellæ entirely free from each other.....**Oribatella** Banks, 1895
[Type: *O. 4-dentata* Banks]

ff. Lamellæ united or joined together for much of their length,
Joelia Oudemans, 1906
[Type: *Oribates fiorii* Coggi]

Family Nothrinæ.

Subfamily Serrariinæ has but one Genus.....**Serrarius** Michael, 1883
[Type: *S. microcephalus* (Nicolet)]

Subfamily Zetorchestinæ has but one Genus.....**Zetorchestes** Berlese, 1888
[Type: *Z. micronychus* (Berlese)]

Key to the Genera of Subfamily Notaspidinæ.

a. Legs inserted well under the body; abdomen strongly arched,
Liacarus[7] Michael, 1898
[Type: *L. simile* (Nicolet)]

aa. Legs inserted at the edges of the body; abdomen not so strongly arched.

b. Lamellæ seldom more than half as long as the cephalothorax and being low blade-like, or ridge-like structures.

c. Lamellæ placed well toward the median plane and running together in front.....**Cultroribula** Berlese, 1908
[Type: *Notaspis juncta* Michael[8]]

cc. Lamellæ, which may be vestigial, placed more laterally, not running together in front, although they may be connected with a translamella,
Lucoppia Berlese, 1908
[Type: *Zetes lucorum* Koch]

bb. Lamellæ very long and narrow, about as long as the cephalothorax, lance-like and provided with cusps in front.

c. Lamellæ attached to cephalothorax for their whole length, except for the small cusp; abdomen somewhat truncate in front, **Conoppia** Berlese, 1908
[Type: *Oppia microptera* Berlese]

cc. Lamellæ attached to cephalothorax for about one-half their length; abdomen circular.....**Notaspis** Hermann, 1804
[Type: *N. bipilis*[9] Hermann]

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[7] = *Liosoma*, which name was found to be preoccupied by Michael.

[8] This species was suggested by Michael in his "British Oribatidæ" as the type of *Notaspis* Hermann, but the type of *Notaspis* Hermann, was fixed by Nicolet in 1854, hence *Zetes lucorum* Koch is available as a type for *Lucoppia* Berlese.

[9] Not *Zetes lucorum* Koch.

Key to the Genera of Subfamily Tegeocraninæ.

a. Cephalothorax and abdomen joined above by a chitinous shield common to both.....**Scutovertex** Michael, 1879
[Type: *S. sculptus* Michael]

aa. Cephalothorax and abdomen not joined by a chitinous shield common to both.

b. Ungues tridactyle.

c. Tibiæ of legs not swollen or pedicellate.

d. Pseudostigmatic organs projecting out of the pseudostigmata.

e. Lamellæ very large, extending forward for almost the whole length of cephalothorax; translamella absent.....**Cepheus** Koch, 1835
[Type: *C. minutus*[10] Koch]

ee. Lamellæ low chitinous bars, united by a translamella,
Chaunoproctus Pearse, 1906
[Type: *C. cancellatus* Pearse]

dd. Pseudostigmatic organs sunk into the pseudostigmata,
Ommatocepheus Berlese, 1913
[Type: *Cepheus ocellatus* Michael]

cc. Tibiæ of the legs somewhat pedicellate and swollen,
Banksia[11] Voigts and Oudemans, 1905
[Type: *Notaspis tegeocranus* Hermann]

bb. Ungues monodactyle.

c. Lamellæ blade-like.

d. Cephalothorax separated from abdomen above by the unbroken anterior border of the latter.....**Tegeocranus** Nicolet, 1855
[Type: *T. coriaceus* (Koch)]

dd. Cephalothorax not completely demarcated from abdomen dorsally, because of the incomplete anterior border of the latter,
Tectocepheus Berlese, 1896
[Type: *T. velatus* (Michael)]

cc. Lamellæ low solid ridges.....**Carabodes** Koch, 1835
[Type: *C. femoralis* (Nicolet)]

Key to the Genera of Subfamily Damaeinæ.

a. Cephalothorax separated from abdomen dorsally by the complete anterior border of the latter.

b. Claws of all the tarsi monodactyle.

c. Abdomen circular or subcircular in outline; genital and anal openings usually close together.

d. Integument of dorsum of abdomen smooth.....**Damaeus** Koch, 1835
[Type: *D. geniculatus* (Linn.)]

dd. Integument of dorsum of abdomen rough, frequently reticulate.
Eremella Berlese, 1913
[Type: *E. vestita* Berlese]

cc. Abdomen oval, longer than broad; genital and anal openings usually separated from each other by a considerable distance.

d. Cheliceræ stout, strongly chelate.

e. Integument of dorsum smooth; larger forms..**Dameosoma** Berlese, 1892
[Type: *D. denticulatum*[12] (Canestrini, G. & R.)]

ee. Integument of dorsum rough (coarsely granular or tuberculate); smaller forms.....**Dameolus** Paoli, 1908
[Type: *D. asperatus* (Berlese)]

dd. Cheliceræ styliform.....**Suctobelba** Paoli, 1908
[Type: *S. trigona* (Michael)]

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[10]Not *C. tegeocranus* (Hermann), or *C. latus* Koch.

[11]Name suggested in 1905 by Voights and Oudemans to replace *Kochia* Oudemans, 1900, which was found to be preoccupied. *Kochia* was suggested by Oudemans to replace *Cepheus* Koch, because the type of the old genus *Cepheus, C. latus* Koch, did not belong to the genus in question.

[12]Named by Paoli to replace the *D. concolor* of Berlese, which was found to be different from the *D. concolor* (Koch).

bb. Claws of the tarsi of the first three pairs of legs monodactyle, of the fourth pair tridactyle.....**Heterobelba** Berlese, 1913
[Type: *H. galerulata* Berlese]

bbb. Claws of all the tarsi tridactyle.

c. Pseudostigmatic organs foliaceous, or flabelliform,
Licneremaeus Paoli, 1908
[Type: *Notaspis licnophora* Michael]

cc. Pseudostigmatic organs not foliaceous or flabelliform.

d. Dorsal integument pitted or reticulate; second pair of legs about as long as others.

e. Tectopedia well developed; dorsal integument of abdomen pitted; hairs of abdomen long, flexible, pectinate,
Tricheremaeus Berlese, 1908
[Type: *Notaspis serrata* Michael]

ee. Tectopedia absent or rudimentary; dorsal integument of abdomen reticulate; hairs of abdomen simple.....**Micreremus** Berlese, 1908
[Type: *Eremaeus brevipes* Michael]

dd. Dorsal integument smooth; second pair of legs shorter than the others,
Heterodamaeus n. gen.
[Type: *Damaeus bicostatus* Koch]

aa. Border between cephalothorax and abdomen incomplete dorsally toward the median line so that the two parts of the body run together here,
Amerus Berlese, 1896
[Type: *A. troisi* (Berlese)]

Key to the Genera of Subfamily Nothrinæ.

a. Abdomen as a whole convex, or arched, above.

b. Dorsal plate of abdomen not fully chitinized; adults carrying cast nymphal skins arranged so as to form concentric areas at different levels,
Neoliodes[13] Berlese, 1888
[Type: *N. theleproctus* (Hermann)]

bb. Dorsal plate of abdomen fully chitinized; adults without cast nymphal skins.

c. Abdomen without lateral excretory tubes.

d. No seta-bearing tubercules on dorsum of abdomen,
Hermannia Nicolet, 1855
[Type: *H. picea* (Koch)]

dd. Mammæ-like, seta-bearing tubercles on dorsum of abdomen,
Masthermannia Berlese, 1913
[Type: *M. mammillaris* (Berlese)]

cc. Abdomen with a pair of lateral excretory tubes projecting some distance from the surface of the body wall.....**Hermanniella** Berlese, 1908
[Type: *H. granulata* (Nicolet)]

aa. Abdomen as a whole not convex above, but flat, concave, or undulating.

b. Abdomen oval in outline, except for the anterior border.

c. Tarsal claws monodactyle.....**Heminothrus**[14] Berlese, 1913
[Type: *Nothrus targionii* Berlese]

cc. Tarsal claws tridactyle.

d. Abdomen with a broad margin above differently marked from a central area.....**Cymbaeremaeus** Berlese, 1896
[Type: *Eremaeus cymba* Nicolet]

dd. Abdomen without a differentiated band or margin above,
Eremaeus Koch, 1842
[Type: *E. oblongus* Koch.]

bb. Abdomen rectangular, or trapezoidal in outline.

c. Abdomen with two large lateral lobes extending backward from its posterior margin.....**Uronothrus**[15] Berlese, 1913
[Type: *Nothrus segnus* (Hermann)]

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[13] = *Liodes* Hermann, which name was found by Berlese to be preoccupied.
[14] Suggested as a subgenus by Berlese in 1913.
[15] Erected as a subgenus by Berlese.

cc. Abdomen without posterior lobes.
d. Abdomen with prominent marginal seta-bearing tubercles, sometimes only behind.....**Nothrus** Koch, 1835
[Type: *N. spiniger* Koch]
dd. Abdomen without seta-bearing tubercles.....**Gymnonothrus** n. gen.
[Type: *Nothrus sylvestris* Nicolet]

Key to the Genera of Subfamily Lohmanninæ.

a. Abdomen subcylindrical; tarsal claws either monodactyle or bidactyle.
b. Tarsal claws monodactyle.....**Lohmannia**[16] Michael, 1898
[Type: *L. paradoxa* (Haller)]
bb. Tarsal claws bidactyle.....**Eulohamannia**[17] Berlese, 1910
[Type: *E. ribagai* Berlese]
aa. Abdomen oval, not cylindrical; tarsal claws tridactyle.
b. Abdomen never divided by a transverse suture above; integument tuberculate; claws homodactyle.....**Tumidalvus**[18] Ewing, 1908
[Type: *T. americana* Ewing]
bb. Abdomen sometimes divided above by a transverse suture; integument not tuberculate; claws sometimes heterodactyle,
Trhypochthonius Berlese, 1904
[Type: *T. tectorum*, Berlese]

Family Hypochthonidæ.

Key to the Genera of Subfamily Hypochthoninæ.

a. Abdomen divided into two parts dorsally by a transverse suture.
b. Tarsal claws tridactyle; cephalothorax truncate in front,
Parhypochthonius Berlese, 1904
[Type: *P. aphidinus* Berlese]
bb. Tarsal claws mondactyle.
c. Abdomen spherical; dorsal surface tessellated,
Sphaerochthonius Berlese, 1910
[Type: *S. splendidus* (Berlese)]
cc. Abdomen not spherical; dorsal surface not tessellated.
d. Abdomen clothed with leaf-like setæ; shoulders each with a seta-bearing tubercle.....**Malacoangelia** Berlese, 1913
[Type: *M. remigera* Berlese]
dd. Abdomen clothed with setiform hairs; shoulders without seta-bearing tubercles.....**Hypochthonius** Koch, 1835
[Type: *H. rufulus* Koch]
aa. Abdomen divided dorsally into three or more parts by transverse sutures.
b. Abdomen clothed with moderate simple setæ.
c. Integument of dorsum of abdomen reticulate; body short,
Brachychthonius Berlese, 1910
[Type: *B. brevis* (Michael)]
cc. Integument of dorsum of abdomen smooth; body long,
Arthrochthonius n. gen.
[Type: *A. pallidulus* (Koch)]
bb. Abdomen bearing some large (enormous) pectinate, foliaceous, or plumose setæ.
c. Body clothed with large, broad, leaf-like or fan-like setæ,
Pterochthonius[19] Berlese, 1913
[Type: *P. angelus* Berlese]

[16] = the old *Michaelia*, which name was shown to be preoccupied by Michael.
[17] Erected as a subgenus by Berlese.
[18] Berlese claims, "Acari Nuovi," Manipulus VI, 1910, that my genus *Tumidalvus* is a synonym of his *Trhypochthonius*, 1904. I hold it to be distinct for reasons shown in the above key.
[19] Erected by Berlese as a subgenus.

cc. When leaf-like, or fan-like setæ present, they are confined to the abdomen.
d. Tarsi very long, slender; legs and cephalothorax clothed with simple setæ.....**Heterochthonius**[20] Berlese, 1910
[Type: *H. gibbus* Berlese]
dd. Tarsi short, stout; legs and cephalothorax clothed with pectinate setæ.....**Cosmochthonius** Berlese, 1910
[Type: *C. lanatus* (Michael)]
Subfamily Trizetinæ has but one Genus.....**Trizetes** Berlese, 1904
[Type: *T. pyramidalis* Berlese]

Family Hoplodermatidæ.

Key to the Genera of Subfamily Protoplophorinæ.

a. Claws of tarsi monodactyle.....**Protoplophora** Berlese, 1910
[Type: *P. palpalis* Berlese]
a. Claws of tarsi bidactyle, heterodactyle, and of enormous length,
Arthroplophora Berlese, 1910
[Type: *A. paradoxa* Berlese]
Subfamily Mesoplophorinæ has but one Genus.....**Mesoplophora** Berlese, 1904
[Type: *M. michaeliana* Berlese]

Key to the Genera of Subfamily Hoplodermatinæ.

a. Ungues monodactyle; anal and genital covers separate.
b. Cephalothorax with a median, dorsal carina.
c. Abdomen with a hood-like projection extending forward from its anterior margin.....**Steganacarus** n. gen.
[Type: *Hoplophora anomala* Berlese]
cc. Abdomen without hood-like projection extending forward from its anterior margin.
d. Abdomen as well as cephalothorax with a median carina above,
Tropacarus n. gen.
[Type: *Hoplophora carinatum* Koch]
dd. Abdomen without dorsal, median carina...**Hoploderma**[21] Michael, 1898
[Type: *H. magna* (Nicolet)]
bb. Cephalothorax without a median carina above.
c. Integument rough, pitted, or sculptured.....**Atropacarus** n. gen.
[Type: *Hoplophora stricula* Koch]
cc. Integument smooth, without pits or sculptures....**Ginglymacarus** n. gen.
[Type: *G. dasypus* (Duges)]
aa. Ungues tridactyle; anal and genital covers fused.
b. Integument rough, pitted, or sculptured.....**Euphthiracarus** n. gen.
[Type: *E. flavus* (Ewing)]
bb. Integument smooth, not pitted or sculptured....**Phthiracarus**[22] Perty, 1841
[Type: *Hoplophora ardua*[23] Koch]

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[20]Although given by Berlese as a subgenus, I hold that the characters are good generic ones.

[21]Name suggested by Michael to replace Hoplophora, which was found to be preoccupied.

[22]=*Tritia* Berlese.

[23]Michael claims that Koch's *Hoplophora decumana* is only a synonym of *Hoploderma dasypus* Duges, hence is not included in *Phthiracarus*. I suggest *Hoplophora ardua* Koch as the type of *Phthiracarus*.

Descriptions of New Genera Here Proposed.

Genus **Eupelops**[24] n. gen.

With the characters of the subfamily **Pelopinæ.** A chitinous hood-like projection extends forward from the anterior margin of the abdomen, which may be narrow, or again quite broad, in the latter case frequently being quadrangular. This chitinous expansion usually unites the two pteromorphæ. Lamellæ present. Translamella present or absent.

Type species: *Pelops uraceus* Koch.

The type species for the genus *Pelops* Koch, *P. acromios* (Hermann), is without either lamellæ or translamella. This new genus is erected, therefore, to include many species which are like *P. acromios* (Hermann) in most respects, but do not have the cephalothorax nude above. Berlese's *Peloptulus*, 1908, includes species which are without the shelf-like projection from the anterior margin of abdomen. Three of our American species are included in *Eupelops: E. latipilosus* (Ewing), *E. minnesotensis* (Ewing), and *E. laticuspidatus* (Ewing).

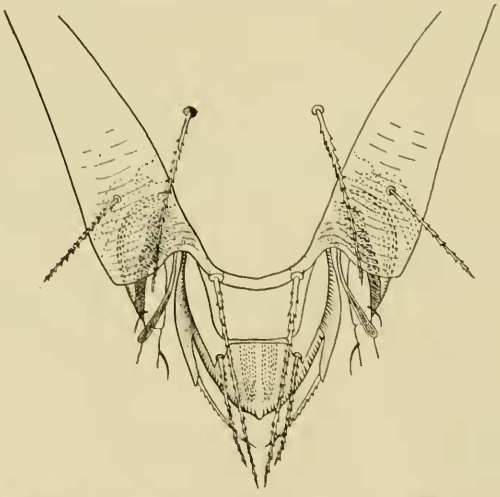

Fig. 1. *Neogymnobates multipilosa* (Ewing). Dorsal view of cephalothorax and anterior part of abdomen.

Genus **Neogymnobates**[25] n. gen.

With the characters of the subfamily **Oribatinæ.** Pteromorphæ attached to cephalothorax as well as to abdomen. Abdomen circular,

[24]From εὖ, good, well + *Pelops*.
[25]From νεος, new + *Gymnobates*.

or almost, in outline and bearing enormous setæ. Lamellæ present, blade-like. Translamella a chitinous ridge. A pair of lateral lamellæ present. Claws tridactyle.

Type species: *N. multipilosus* (Ewing). (See Fig. 1).

This genus is erected for a peculiar species described by the writer some years ago from specimens obtained in northern Illinois, not far from Chicago. At the time of collection I recognized that the species was quite different from other beetle mites, but hesitated in making it the type of a new genus. I regard this species, in a way, as a connecting link between the peculiar genus *Oripoda* Banks and Pergande and the other members of the subfamily *Oribatinæ*. It has the pteromorphæ of *Oripoda*, but the body of a true *Oribata*.

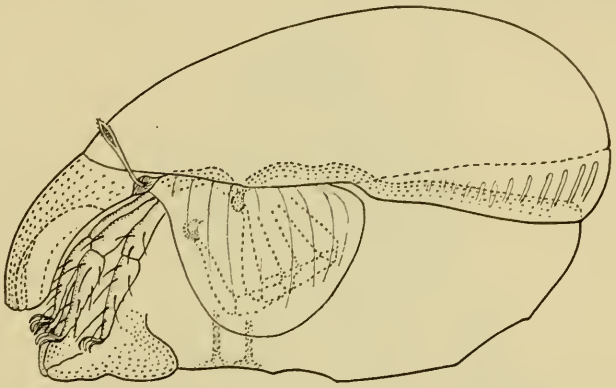

Fig. 2. *Tegoribates subniger* n. sp. Side view of individual with its legs flexed.

Genus **Tegoribates**[26] n. gen.

With the characters of the subfamily **Oribatinæ.** Pteromorphæ attached to abdomen only, truncate in front, not extending far beyond the anterior margin of abdomen, and not united by a transverse lamella. Cephalothorax completely covered by a roof-like projection which arises from the line of junction between the cephalothorax and abdomen and extends forward almost to the tip of the former.

Type species: *T. subniger* n. sp.[27] (See Fig. 2).

The large roof-like or hood-like projection above the cephalothorax in this genus makes it unique among the beetle-mites, and for that matter unique among all the mites in this respect. The nearest approach to this condition is found in the genus

[26]Meaning a covered *Oribates*.

[27]The descriptions of this species has been sent away for publication in Part II of my series on "New Acarina."

Joelia Oudemans, where the very large lamellæ are joined together in front at the median plane; however, in the case of *Joelia*, this junction is not complete so that no roof-like structure is formed. The genus *Tegoribates*, however, appears to be more closely related to some of the other genera than to *Joelia* Oudemans.

Genus **Neoribatula**[28] n. gen.

With the characters of the subfamily **Oribatinæ.** Pteromorphæ very small, rudimentary, attached to the abdomen only, truncate in front, not extending beyond the anterior margin of abdomen, and not united by a transverse lamella. Cephalothorax not covered by a roof-like projection. Lamellæ attached to cephalothorax along most of their inner margins. Translamella present.

Type species: *N. brevisetosa* (Ewing). (See Fig. 3).

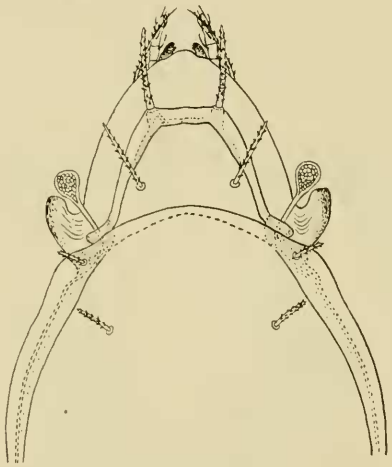

Fig. 3. *Neoribatula brevisetosa* (Ewing). Dorsal view of cephalothorax and anterior part of abdomen.

This genus is related to *Oribatodes* Banks and to *Oribatula* Berlese, but differs from both of these genera in having the translamella present and well developed.

Genus **Heterodamaeus**[29] n. gen.

With the characters of the subfamily **Damaeinæ.** Cephalothorax separated from abdomen dorsally by a complete anterior border of the latter. Tarsal claws all tridactyle. Pseudostigmatic organs not foliaceous or flabellate. Dorsal integument smooth. Second pair of legs shorter than others. Abdomen almost circular in outline, flat above.

Type species: *Damaeus bicosticus* Koch.

[28]From νεος, new + *Oribatula.*

[29]From ἕτερος, other than usual, different + *Damaeus.*

This genus is suggested to include some species of the old world and at least one from the new, *Damaeus magnisetosus* Ewing. Most of the species have the pseudostigmatic organs very long, the integument of the legs minutely tuberculate, while the tibiæ of the first pair of legs each bears above and distally a large tubercle from which a long tactile seta extends.

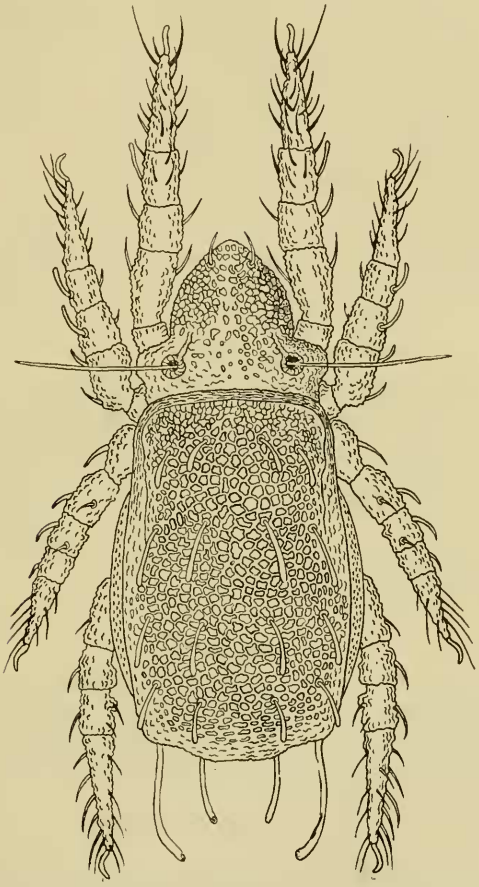

Fig. 4. *Nothrus sylvestris* Nicolet. Drawing made from a named specimen received from Michael.

Genus **Gymnonothrus**[30] n. gen.

With the characters of the subfamily **Nothrinæ.** Abdomen as a whole not convex above, but flat, concave, or undulating; rectangular or trapezoidal in outline. The abdomen is without large lobes behind, and also without seta-bearing tubercles.

Type species: *Nothrus sylvestris* Nicolet. (See Fig. 4).

[30]From γυμνός, naked + *Nothrus*.

This genus is erected to include the many nude species, which in the past have been placed in the genus *Nothrus*, but which differ markedly from the extreme and fantastic type species of that genus, *Nothrus spiniger* Koch.

Genus **Arthrochthonius**[31] n. gen.

With the characters of the subfamily **Hypochthoninæ.** Abdomen divided into three or more parts dorsally by transverse sutures, sides strongly depressed, shelf-like, clothed with moderate simple setæ. Integument of dorsum of abdomen smooth; body long, pyriform in outline. Cephalothorax without setæ above; pseudostigmatic organs very long; legs rather short; claws monodactyle.

Type species: *Hypochthonius pallidulus* Koch.

Erected to include many species related to those belonging to *Brachychthonius* Berlese, but having the body longer, the sides strongly depressed, and the integument smooth.

Genus **Steganacarus**[32] n. gen.

With the characters of the subfamily **Hoplodermatinæ.** Tarsal claws monodactyle; anal and genital covers separate. Cephalothorax provided with a median dorsal ridge or carina. Abdomen with a hood-like projection extending forward from its anterior margin.

Type species: *Hoplophora anomala* Berlese.

At least one of our North American species, *S. cucullatum* (Ewing), is included in this genus.

Genus **Tropacarus**[33] n. gen.

With the characters of the subfamily **Hoplodermatinæ.** Claws of tarsi monodactyle; anal and genital covers separate. Cephalothorax with a median carina above. Abdomen without hood-like projection extending forward from its anterior margin, but with a median carina above like the one on the cephalothorax.

Type species: *Hoplophora carinatum* Koch.

This genus is founded on this peculiar species of Koch's with the dorsal carina on both the abdomen and cephalothorax. I know of no American species which has these characteristics.

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[31]From ἀ'ρθρον, joint + *Chthonius*.
[32]From στεγανός, covered + *Acarus*.
[33]From τρόπις, keel + *Acarus*.

Genus **Atropacarus**[34] n. gen.

With the characters of the subfamily **Hoplodermatinæ**. Tarsal claws monodactyle; anal and genital covers separate. Cephalothorax without a median carina above. Integument rough, pitted, or sculptured.

Type species: *Hoplophora stricula* Koch.

One of our American species, *A. illinoiensis* (Ewing), known to be included in this new genus. There may be others.

Fig. 5. *Ginglymarcarus dasypus* (Duges). Drawing made from a named specimen received from Michael.

Genus **Ginglymacarus**[35] n. gen.

With the characters of the subfamily **Hoplodermatinæ**. Tarsal claws monodactyle; anal and genital covers separate. Cephalothorax without a median carina above. Integument smooth, without pits or sculptures.

Type species: *G. dasypus* (Duges). (See Fig. 5).

In this genus we find in our country at least two species besides the type species. They are *G. sphaerula* Banks and *G. lurida* Ewing. The genus will be found to include many foreign species.

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[34]From a, not + τρόπις, keel + *Acarus*.
[35]From γίγγλυμος, hinge joint + *Acarus*.

Genus **Euphthiracarus**[36] n. gen.

With the characters of the subfamily **Hoplodermatinæ.** Ungues tridactyle; anal and genital covers fused. Integument rough, pitted or sculptured. (See Fig. 6).

Type species: *E. flavus* (Ewing).

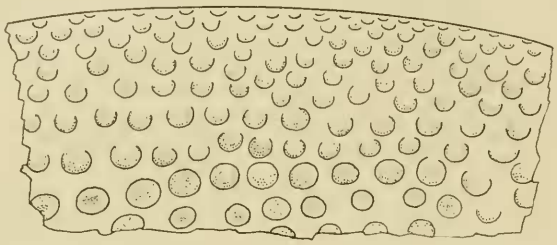

Fig. 6. *Euphthiracarus flavus* (Ewing). Side view of a section of the arched part of the abdomen to show nature of pitting.

This genus is suggested for the rough or pitted species of the old genus *Phthiracarus*. In this country I know of only one such species, the type. We have, however, about a dozen described species of the old genus *Phthiracarus*.

Acknowledgment.

Dr. J. W. Folsom, of the University of Illinois, aided the writer very materially in the preparation of this synopsis by offering him a laboratory in which to work and by helping secure some of the much needed literature.

[36]From εὖ, good, well + *Phthiracarus*.